PROACT FACT SHEET

An Environmental Resource sponsored by HQ Air Force Center for Environmental Excellence

Sustainable Development

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Purpose

The purpose of this fact sheet is to increase Air Force awareness of sustainable development principles and provide sources of information to USAF environmental, engineering and architectural staffs as they seek to cooperatively plan, design, build, and renovate sustainable structures.

Introduction

Sustainable development creates high-performance buildings that protect ecosystems, conserve resources, improve the indoor and outdoor environment, and enhance people's living conditions and health. Headquarters for the USAF defines sustainable design as,

> *"...an investment in the future. Through conservation, improved maintainability, recycling, reuse, reduction and other actions and innovations, we can meet today's needs without compromising the ability of future generations to meet their own. Sustainable development supports an increased commitment to environmental stewardship and conservation, and results in an optimal balance of cost, environmental, societal and human benefits while meeting the mission and function of the intended facility or infrastructure."*

Goals

The goals of sustainable development are to conserve energy, water, and raw materials; prevent the environmental degradation that can be caused by building construction, operations, and disposal; and create built environments which are livable, healthy, maintainable, and productive. This approach reflects the USAF commitment to environmental stewardship and conservation while balancing cost, environmental, and mission needs. To meet this goal, USAF construction planners and engineers may consider:

- Using resources efficiently and minimizing the consumption of raw material resources (energy, water, land, and materials) during the construction and life of the facility;
- Maximizing the reuse of resources;
- Seeking out renewable energy sources as opposed to using fossil fuels;
- Creating a healthy environment for workers, visitors and neighbors;
- Designing facilities for long term durability, flexibility and eventual reuse; and
- Protecting and restoring the natural environment.

Applicability

It is Air Force policy to apply sustainable development concepts in the planning, design, construction, operation, maintenance and disposal of facilities and infrastructure projects, consistent with budget and mission requirements. Sustainable development concepts will benefit the Air Force by creating high-performance buildings with long-term value. These concepts will be integrated into the development process and balanced with all other design criteria to achieve best value for the Air Force. The Air Force Sustainable Development Policy memorandum from (HQ USAF/ILE), dated December 19, 2001, can be accessed at http://www.afcee.brooks.af.mil/green/resources/policymemo.doc.

Definitions

The Air Force Sustainable Development Policy defines a sustainable facility as one that "achieves optimum resource efficiency and constructability while minimizing adverse impacts to the built and natural environments through all phases of its life cycle."

Environmentally Preferable:

Products or services which have a lesser or reduced effect on human health and the environment when compared with other products and services that serve the same purpose. The comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service. Alternatives exist for nearly every building product and system. However, each alternative has a different environmental impact. In most cases, practical and affordable "green" solutions are available that are significantly better in meeting the Air Force's environmental goals.

Life Cycle:

The life cycle of a product encompasses the original procurement of raw materials, its refinements, manufacturing, shipping and installation, use and, disposal or recycling. Any process associated with the steps within the life cycle of a product can have an environmental impact. Similar products can have widely different upstream and downstream impacts on the environment. Understanding the various environmental impacts and benefits in the life cycle of a material enables USAF personnel to make responsible procurement decisions.

Life Cycle Analysis:

Analysis of the environmental impact of processes associated with products and building materials from the gathering of raw materials, through manufacture, to the end of usefulness and disposal.

Life Cycle Cost:

The cost accrued throughout the useful life of a building or material. Life cycle costs address the capital costs involved in production, maintenance and disposal of a building or material.

Renewable Resources:
A resource, such as energy, water or a raw material, which is consumed at a rate that does not exceed its ability to naturally replenish or regenerate itself. Examples of renewable energy would be solar radiation, wind or heat from the Earth's interior.

Benefits
Sustainable facilities consume less energy and water, provide better indoor environmental quality, and are durable and easy to maintain. Some examples include:

- Effective daylighting, combined with well-insulated building envelopes and efficient HVAC systems, creates pleasant indoor environments while cutting energy bills.
- Careful material selection reduces personnel exposure to potentially carcinogenic volatile organic compounds and formaldehyde.
- Durable finishes will cut maintenance costs, avoid maintenance and prevent environmental impacts.

Tools
The following are tools for meeting the Air Force Sustainable Development Policy:

Air Force Sustainable Facilities Guide
This tool has been developed as a strategic resource for USAF project managers to aid the development of future buildings and infrastructure that:

- Reduce the life cycle cost of Air Force facilities.
- Reduce the environmental impact of these facilities.
- Improve the building users' health and productivity.
- Improve the rate and efficiency of complying with existing Executive Orders, Policy Acts, and Laws that pertain to the environment.

Air Force Sustainable Facilities Guide is available at http://www.afcee.brooks.af.mil/dc/dcd/arch/rfg/index.html

Leadership in Energy and Environmental Design (LEED)
The USAF has adopted the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED™) as a tool to apply sustainable design principles, and subsequently as a metric to measure the sustainability achieved through the design and construction process. LEED™ is a self-assessment system designed for rating new and existing commercial, institutional, and high-rise residential buildings. The system awards points based on the number of LEED™ credits earned. These credits are earned by using products, systems, strategies, or technologies described in LEED™. At least twenty percent of each MAJCOM's projects were selected as LEED™ pilot projects in FY04 and increasing percentages of projects will qualify for qualification in subsequent years. The goal is to have all MILCON projects in the FY09 program capable of achieving LEED™ certification. USGBC LEED™ Green Building Rating System can be accessed at http://www.usgbc.org/.

Whole Building Design Guide (WBDG)
This tool provides additional technical guidance for sustainability principles. The Construction Criteria Base (CCB) has for many years been the official DoD distribution system for all facilities-related criteria. CCB is currently being expanded into a new system called the Whole Building Design Guide (WBDG) that will offer far greater capability as a design tool. This guide can be accessed at http://www.wbdg.org. Refer to the "Design Guidance" section, then select "Design Objectives" and view the "Sustainable" criteria. The WBDG is a resource supported by the USAF and serves as the primary source for sustainable development information and methodologies.

Security, Safety and Sustainability
Sustainable development enables us to improve national security by moving toward energy independence. Force protection standards can also be successfully integrated with sustainable development. Trade-offs and synergies are discussed in the Whole Building Design Guide resource page on "Balancing Security/Safety and Sustainability Objectives," found at http://www.wbdg.org/design/resource.php?cn=2.7&cx=0&rp=28.

For more sustainable development information visit the following websites:

HQ AFCEE Sustainable Development website:
http://www.afcee.brooks.af.mil/eq/programs/progpage.asp?PID=27

HQ AFCEE Sustainable Development Toolbox:
http://www.afcee.brooks.af.mil/green/resources/toolbox/TOOLBOX.asp

LEED lessons learned:
http://www.afcee.brooks.af.mil/eq/sustain/LEED_Lessons_Learned.doc

Publications, guidance, links and working groups – go to DENIX website:
https://www.denix.osd.mil/denix/Public/Library/Sustain/sustain.html

Executive Order Cross-Reference for Facility Sustainability Directives:
http://www.afcee.brooks.af.mil/eq/sustain/ExecOrderCrossReference.doc

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